

## **Category: Ground Support Equipment (GSE)**

This category includes 2-stroke and 4-stroke gasoline & diesel fueled ground support equipment (GSE) used in various airport operations. These equipment perform a variety of functions, including: starting aircraft, aircraft maintenance, aircraft fueling, transporting cargo to and from aircraft, loading cargo, transporting passengers to and from aircraft, baggage handling, lavatory and food service.

The top 5 most popular equipment types in this category are:

<b>Equipment Type</b>	<b>Fuel Type</b>	<b>2000 Population</b>
Baggage Tug	G4	738
Cargo Tractor	G4	655
Baggage Tug	D	479
Belt Loader	G4	348
Service Truck	G4	347

The top 5 equipment with the highest annual activity are:

<b>Equipment Type</b>	<b>Fuel Type</b>	<b>(hr/yr) Activity</b>
Generator	D	8149
Fuel Truck	D	3490
Air Conditioner	D	2425
Service Truck	D	1930
Bobtail	D	1867

### **Emissions Inventory:**

As with other OFFROAD equipment types, the emissions inventory for the ground support equipment category is calculated as the product of the emission rate (grams per horsepower-hour), engine population, and activity (hours per year) in annual average use hours.

[Calculating Emissions Inventory \(PDF Format\)](#)

For the current emissions inventory (tons/day):

[Air Resources Board Almanac](#)

## **Input Data Sources:**

The input factors used by the OFFROAD Model come from various data sources:

Input Factor	Source of Data
Population (base year 2000)	Air Transport Association (ATA) survey (2004)
Useful Life	Air Transport Association (ATA) survey (2004)
Activity (hr/yr)	Air Transport Association (ATA) survey (2004)
Average horsepower	Power Systems Research (1996)
Load factor	Power Systems Research (1996)
Allocation factor	Energy & Environmental Analysis (EEA) document (1995)
Growth factor	US DOT FAA Flight operation data (1997)
Survival rate	Power Systems Research (1996)

For more additional background information on the input factors used by the OFFROAD Model: [\(Document Link\)](#)

For tables of input data for ground support equipment: [\(Document Link\)](#)

## **Adopted Regulations for Ground Support Equipment:**

**2004:** (*Reflected in OFFROAD Model*) Board approved amendment to California's existing off-road diesel regulations to harmonize with USEPA Tier 4 regulation (40 CFR 1039). [\(Document Link\)](#)

**2002:** (*Reflected in OFFROAD Model*) This MOU includes provisions for the early introduction of clean units and a 2.65 g/bhp-hr HC+NO<sub>x</sub> fleet average in the South Coast Air Basin by December 31, 2010. [\(Document Link\)](#)

**2000:** (*Reflected in OFFROAD Model*) Board approved the emissions inventory for off-road large CI engines ( $\geq 25$ hp) from the OFFROAD Model. [\(Document Link\)](#)

## **Future Improvements to the Ground Support Equipment Category:**

The emissions inventory from the OFFROAD Model strives to accurately represent the 'real-world' as accurately as possible. Therefore, the methodologies and data sources are constantly re-evaluated and updated where applicable. The following items are future improvements for the GSE category:

- Update growth, average horsepower and load factors as new data becomes available
- Allocate equipment from the county down to the neighborhood level (GIS)